REMARKS

Claims 1-62 are pending in this Application. By this Amendment, claims 1, 8, 28, 34, 41, and 61-62 have been amended. Support for the amendments may be found at least in original claim 9 and throughout the Specification (e.g., paragraph [0058]). No new matter is added. Reconsideration in view of the above amendments and the following remarks is respectfully requested.

The courtesies extended to Applicants' representative by Examiner Perez at the telephonic interview held on January 15, 2009, are greatly appreciated. The reasons presented during the interview as warranting favorable action are incorporated into the remarks below and constitute Applicants' record of the interview.

I. Claims Define Patentable Subject Matter

The Office Action rejects claims 1-8, 16-18, 20-21, 29, 34-41, 49-51, 53-54, and 61-62 under 35 U.S.C. §103(a) as being unpatentable over Affes (US 2002/0051433) in view of Unser ("Sampling – 50 Years After Shannon", Proceedings of the IEEE, Vol. 88, No. 4: pages 569-587, April 2000); rejects claims 9-15, 19, 22-25, 30, 42-48, 52, and 55-58 under 35 U.S.C. §103(a) as being unpatentable over Affes in view of Unser and further in view of Agee (US 2003/0123384); rejects claims 26 and 59 under 35 U.S.C. §103(a) as being unpatentable over Affes in view of Unser, Agee, and further in view of Huang (USPN 6,370,129); rejects claims 27 and 60 under 35 U.S.C. §103(a) as being unpatentable over Affes in view of Unser and further in view of Shatti (USPN 7,076,168); rejects claim 28 under 35 U.S.C. §103(a) as being unpatentable over Affes in view of Unser and further in view of Langberg (USPN 5,852,630); and rejects claims 31-33 under 35 U.S.C. §103(a) as being unpatentable over Affes in view of Unser, Agee, and further in

view of Baum (USPN 7,218,666). To the extent that these rejections remain applicable to the claims, as amended, the Applicants respectfully traverse these rejections, as follows.

The Applicants disclose a novel and unobvious approach for processing signals that are sent over a wireless communication channel. For example, in accordance with an embodiment of the disclosure, a receiver may decode a received signal by sampling the received signal with a sampling frequency that is lower than the sampling frequency given by the Shannon theorem, lower than the chip rate of the received signal, but greater than the rate of innovation of the received signal. Such a decoding method may thus reduce the complexity and cost of receivers while retaining equivalent decoding performances.

Amended claim 1 recites, *inter alia*, "sampling the received signal (y(t)) with a sampling frequency (f_s) lower than the sampling frequency given by the Shannon theorem, lower than the chip rate ($1/T_c$) of said received signal (y(t)), but greater than the rate of innovation (ρ) of said received signal (y(t)), for generating a set of sampled values ($y(nT_s)$)" (emphasis added). Claims 28, 34, and 61-62 recite similar features.

In rejecting the claims, the Examiner, at page 8 of the September 19, 2008, Office Action acknowledges that the primary reference, Affes, does not disclose or suggest sampling the signal with a sampling frequency that is lower than the chip rate ($1/T_c$) of the signal, as recited in claim 1, yet relies on Unser to make up for the lack of disclosure in Affes.

The Examiner, at pages 8-9 of the Office Action, cites section V, B of Unser, and asserts that "one of ordinary skill in the art at the time of the invention would clearly recognize that in the case where the degrees of freedom rate of the signal is lower than the chip rate of the signal, it would be obvious to sample the signal at a rate (frequency) between chip rate and the degrees of freedom rate, since lowering (minimizing) the sampling rate of the received signal lessens the

computational burden and complexity of the receiver, and sampling at a rate over the degrees of freedom rate allows for reconstruction of the signal information in a manner which minimizes signal information error."

The Applicants note that the Examiner fails to indicate exactly where Unser discloses sampling a signal with a frequency lower than the chip rate. Furthermore, after careful review of Unser, the Applicants respectfully assert that Unser nowhere whatsoever discloses a sampling frequency lower than the chip rate. Unser, at section V, B, lines 7-9, merely states that "a reconstruction is generally possible provided there are as many measurements as there are degrees of freedom in the signal representation," and does not suggest a sampling frequency lower than the chip rate of the received signal, as recited in amended claims 1, 28, 34, and 61-62.

Further, Affes, in paragraph [0119], specifically discloses that "the matched filtered signal vector Y(t) ... is sampled by sampler 23 at the chip rate $1/T_c$" (emphasis added), and not at a rate lower than the chip rate. In paragraphs [0138]-[0139], Affes states that "after sampling at the chip rate $1/T_c$ and framing over 2L-1 chip samples at the bit rate to from a frame, the preprocessing unit 18 derives the Mx(2L – 1) matched-filtering observation matrix." Throughout paragraphs [0140]-[0145], Affes describes how using a post-correlation data model (PCM) with the matrix parameters derived from sampling the signal vector Y(t) at the chip rate $1/T_c$ reduces inter-symbol interference. Thus, not only does Affes fails to disclose a sampling frequency lower than the chip rate, Affes teaches away from such a sampling frequency by placing such a great emphasis on sampling at the chip rate in order to reduce inter-symbol interference. Thus, even if Unser did disclose a sampling frequency lower than the chip rate (not admitted), one of ordinary skill in the art would not be motivated to lower the sampling frequency of Affes to below the chip rate because such a modification would potentially render

the device of Affes inoperable for its intended purpose (i.e., fail to reduce inter-symbol interference due to the lower sampling rate).

Accordingly, the Applicants respectfully submit that, Affes and Unser, either individually or in combination, fail to disclose or suggest sampling a received signal with a sampling frequency lower than the chip rate of the received signal, as recited in claims 1, 28, 34, and 61-62; and that there is no motivation to modify Affes with a sampling frequency lower than the chip rate.

Secondary references Agee, Huang, Shatti, Langberg, Baum, either individually or in combination with Affes and Unser also fail to disclose or suggest a method including at least sampling a signal with a sampling frequency lower than the chip rate, as recited in claims 1 and 28, 34, and 61-62, and as such, fail to make up for the deficiencies of Affes and Unser.

In accordance with the above remarks, the Applicants respectfully submit that Affes, Unser, Agee, Huang, Shatti, Langberg, and Baum, either individually or in combination, fail to disclose or suggest at least the sampling frequency feature recited in claims 1, 28, 34, and 61-62.

A. Claims 9 and 42

Regarding dependent claims 9 and 42, the Applicants note that the Examiner failed to consider the feature "retrieving the delays ($\tau_k^{(l)}$) and the amplitude attenuations ($a_k^{(l)}$) induced by said communication channel on said sent signal (y(t)), from said set of spectral values (Y[m]) corresponding to said received signal (y(t)) and from said spectral values ($S_k[m]$) corresponding to each of said user specific coding sequence ($s_k(t)$)," as recited in claim 9 and similarly recited in claim 42.

Furthermore, the Applicants respectfully submit that none of the prior art references, either individually or in combination, disclose or suggest the aforementioned feature recited in claims 9 and 42.

B. Claims 22 and 55

Regarding dependent claims 22 and 55, the Applicants note that the Examiner failed to consider the feature "retrieving the ... direction of arrival ($\theta_k^{(l)}$) induced by said communication channel on said sent signal ($y(t)$) from said sets of spectral values ($Y_i[m]$) corresponding to said received signals ($y_i(t)$) and from said spectral values ($S_k[m]$) corresponding to each of said user specific coding sequence ($s_k(t)$)" (emphasis added), as recited in claim 22 and similarly recited in claim 55.

Furthermore, the Applicants respectfully submit that none of the prior art references, either individually or in combination, disclose or suggest the aforementioned feature recited in claims 22 and 55.

II. Conclusion

Accordingly the Applicants submit that claims 1, 28, 34, and 61-62 define patentable subject matter. Claims 2-33 and 35-60 depend from claims 1 and 34, respectively, and therefore, also define patentable subject matter, as well as for the additional features recited therein.

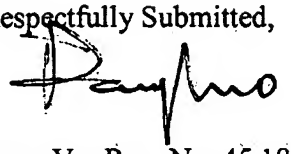
In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-62 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is requested to contact the undersigned at the telephone number set forth below.

Please charge any fees or overpayments that may be due with this response to Deposit Account No. 17-0026.

Respectfully Submitted,

Dated: 2/19/09

By: 

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